

Akashi College		Year	2022		Course Title	Steel Structures B	
Course Information							
Course Code		4421		Course Category		Specialized / Compulsory	
Class Format		Lecture		Credits		School Credit: 1	
Department		Architecture		Student Grade		4th	
Term		Second Semester		Classes per Week		2	
Textbook and/or Teaching Materials							
Instructor		NAKAGAWA Hajime					
Course Objectives							
1) To calculate the allowable stress level of steel, and to design the section of a column and a beam. 2) To do the assignment in the design the joint of a beam, and be able to execute the design of various joint. 3) To take photos of actual steel frame structures around the student residence area and to elaborate a report using the knowledge acquired.							
Rubric							
		Excellent		Good		Insufficient	
Achievement 1		Can well calculate and design the structural members receiving axial force and bending.		Can calculate and design the structural members receiving axial force and bending.		Can not calculate or design the structural members receiving axial force and bending.	
Achievement 2		Can well calculate and design bending structural members.		Can calculate and design bending structural members.		Can not calculate and design bending structural members.	
Achievement 3		Can well calculate and design the joint (column, beam joint, etc.)		Can calculate and design the joint (column, beam joint, etc.)		Can not calculate and design the joint (column, beam joint, etc.)	
Assigned Department Objectives							
Teaching Method							
Outline		Steel structures have its parts produced in factories, structural elements such as columns and beams, and the framework are assembled in the site by joining those elements with high-strength bolts or welding. In this course, the students will learn about compressed material, bending material, the cross-sectional design method of material to subjected to bending and axial force, and the design method of the beam, column joint, and pillar/ beam joint.The course will give examples of how the content learned relates to design and construction work in the real world.					
Style		The course will follow the textbook. At the end of each chapter, the students will handle reports. At the free assignment, the students will compare the contents learned in class with steel structure they have observed in the city.					
Notice		The course will present as many examples as possible of steel (steel frame) structure. The students should take notes during class and handle our requested assignments. 5 absences will be excused.					
Characteristics of Class / Division in Learning							
<input type="checkbox"/> Active Learning		<input type="checkbox"/> Aided by ICT		<input checked="" type="checkbox"/> Applicable to Remote Class		<input checked="" type="checkbox"/> Instructor Professionally Experienced	
Course Plan							
			Theme		Goals		
2nd Semester	3rd Quarter	1st	Compression member (B-1) Lecture on the design equation of compression member.		To understand the pros and cons of steel structure, types and mechanical properties of steel materials.		
		2nd	Compression member (B-2) Explanation of an example model of compression member. Assignment (1)		To explain the width-to-thickness ratio of a compression member, and the design example of the textbook. To design a compression member.		
		3rd	Bending member (1) Lecture on the stress of bending member through the example model. Quiz (1)		To understand bending members (beams) and stress.		
		4th	Bending member (1) Lecture on the lateral buckling torsion of a bending member.		To understand the transverse torsional buckling of bending members (uniform twist and restraint twist).		
		5th	Bending member (2) Lecture on the lateral buckling torsion of a bending member.		To understand the transverse torsional buckling of bending members (uniform twist and restraint twist).		
		6th	Bending member (3) Lecture on the allowable stress method of bending member.		To understand and design the allowable bending stress of a bending member.		
		7th	Bending member (5) Introduction to a design example of bending member. Assignment (2)		To understand and design a bending member.		
		8th	Mid-term Exam				
	4th Quarter	9th	Member under axial force and bending moment (1) Explanation, using the example model, of the column member and the relationship of axial force and bending moment .		Bending, shearing, and axial force act on the pillar. Using an example, to understand the relationship between axial force and bending.		

		10th	Member under axial force and bending moment (2) Lecture on the allowable stress method of the column member.	To understand and design axial force and structural members to be bent.
		11th	Member under axial force and bending moment (3) Explanation of an example model of the column material. Assignment (3)	To understand and design axial force and structural members to be bent. To design a pillar based on the example of the textbook.
		12th	Column and beam joint (1) Lectures on the column-beam joint and the design method of beam joint.	To understand the basics of joints and design beam joints through the analysis of samples of methods of joining pillars and beam structural members.
		13th	Column and beam joint (2) Lecture on the design method of beam joint. Explanation of the allowable stress joint design, all strength joint design and the ultimate joint design for beam joint.	To understand the design method of the beam joint.
		14th	Column and beam joint (3) Explanation of an example of a model of beam joint. Assignment (4)	To understand the design method of the beam joint.
		15th	Column and beam joint (4) Lecture on the design method of column joint and column-beam joints. Introduction to how to think about the three type of diaphragm based on joint design experience. Quiz (2)	To understand joining method of pillar-beam joint and its design method.
		16th	End-term Exam	

Evaluation Method and Weight (%)

	Examination	Assignments	Quiz	Total
Subtotal	70	15	0	85
Basic Proficiency	0	0	0	0
Specialized Proficiency	70	15	0	85
Cross Area Proficiency	0	0	0	0